

Atlas of Anatomy

Latin Nomenclature

Third Edition

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Anne M. Gilroy
Brian R. MacPherson


Based on the work of
Michael Schuenke
Erik Schulte
Udo Schumacher

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Hugo Zeberg

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Markus Voll
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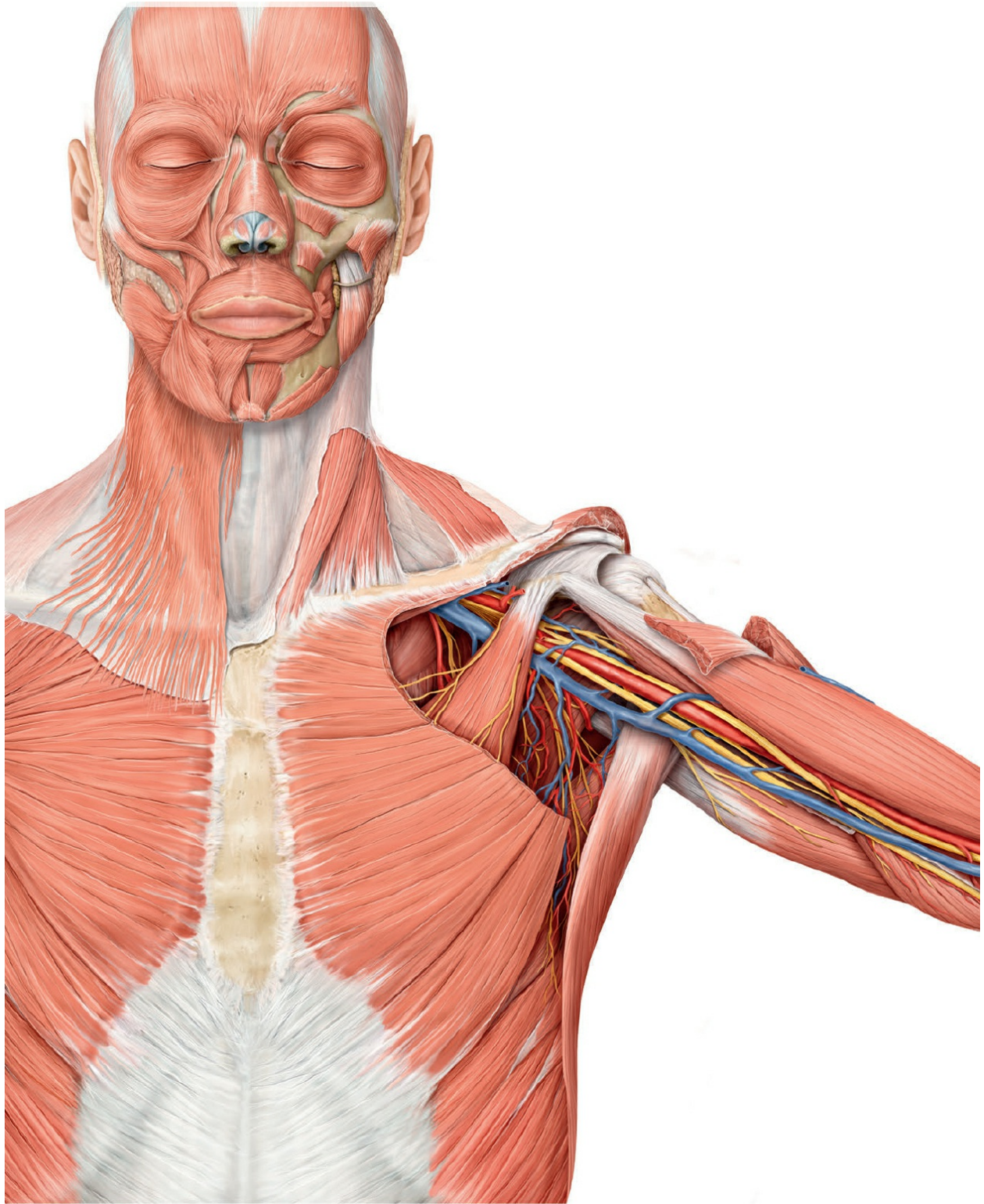


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Third Edition

Latin Nomenclature

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Dedication



We dedicate this third edition of the *Atlas of Anatomy* to the memory of Lawrence (“Larry”) McIvor Ross, 1938–2015. Larry was an outstanding anatomist and cherished mentor and colleague. He started his academic career in 1968 as a faculty member in the Department of Anatomy at UTMB – Galveston. After six years he accepted an appointment in the Department of Anatomy at Michigan State University (MSU) and remained there until he retired in 2000. Larry was passionate about making a difference in the lives of his students, however, and continued to teach as a visiting professor at St. George's University on Grenada in the West Indies for nine years and as an adjunct professor in the Department of Neurobiology and Anatomy at the University of Texas Medical School – Houston until 2014. Fellow anatomists admired his dedication as a member of the American Association of Clinical Anatomists where he served the association in every position on the Executive Council. In 2015 he was honored for his service to the association with the *R. Benton Adkins Jr. Distinguished Service Award*.

As an academician, Larry was a true multidisciplinary anatomist, teaching

histology, neuroanatomy, gross anatomy, and embryology to thousands of medical and graduate students as well as numerous non-medical groups. As an author, he will be remembered best for his work with Thieme Publishers. From 2005 to 2007 he co-edited the English translation of all three volumes of *Prometheus: Atlas of Anatomy*. Following the critical success of the three-volume atlas in English-speaking countries, he was instrumental in helping Thieme create the concept for the single-volume *Atlas of Anatomy*. This atlas, now in its third edition, is highly acclaimed in its own right and is distributed worldwide and translated in over 14 languages. As his co-authors, we are most grateful to Larry for his mentorship. He was responsible for bringing us onto the project and into the world of medical publications. We feel personally indebted for all he did for us, and will fondly remember him as a great mentor, friend, and colleague.

Anne and Brian

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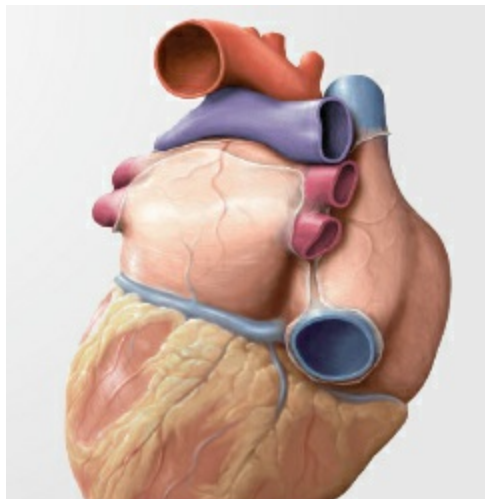
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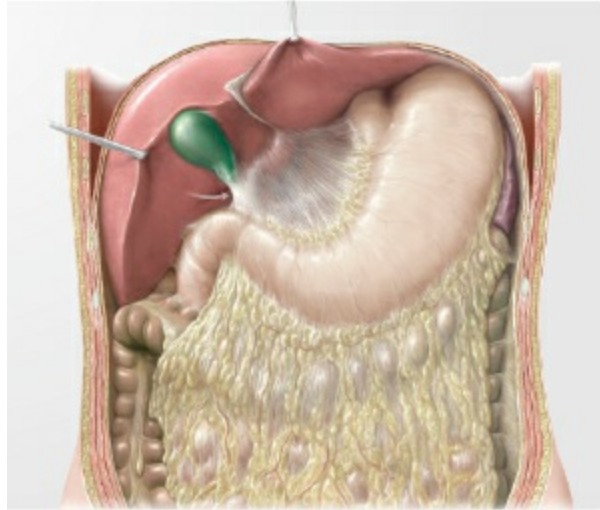
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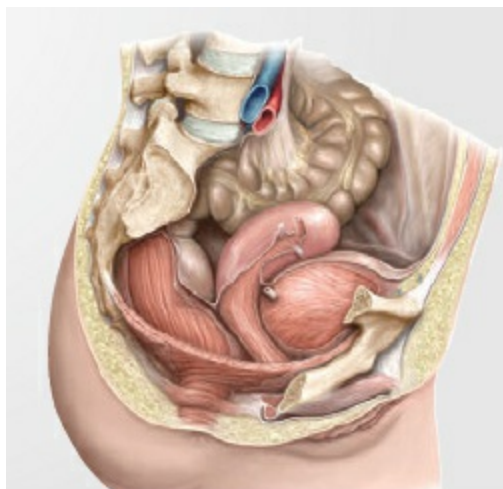
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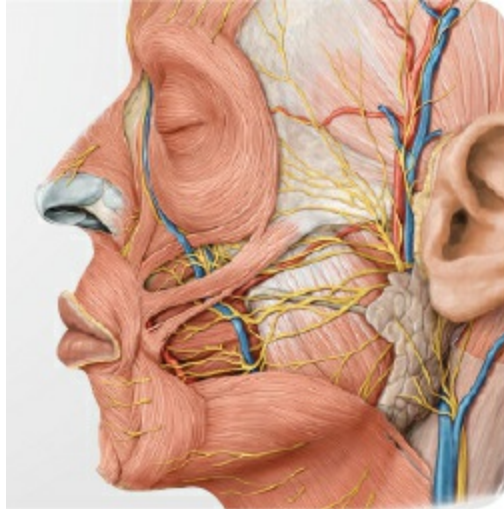
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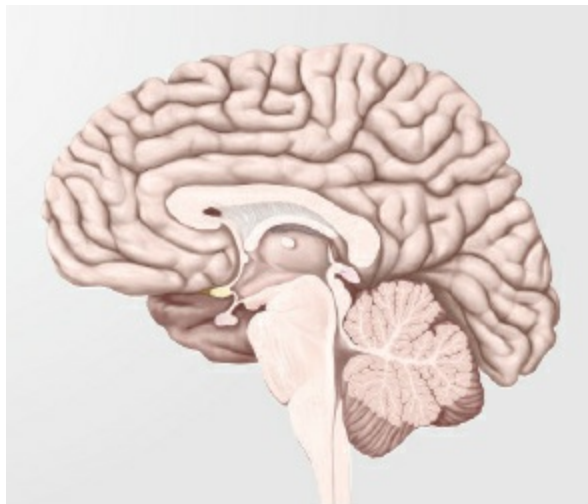
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Acknowledgments

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We thank the many instructors and students who have pointed out to us what we have done well and brought to our attention errors, ambiguities, and new information, or have suggested how we could present a topic more effectively. This input, combined with our experience teaching with the Atlas, have guided our work on this edition.

We again cordially thank the members of the first edition Advisory Board for their contributions:

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It has been a great honor to act as a consulting editor, with responsibility for the Latin nomenclature, for *Atlas of Anatomy, Third Edition*. There were several people from whom I received a great deal of assistance and guidance, and must express my gratitude towards. Regarding the discussion of nomenclature, I would wish to thank my mentor Prof. Peter Århem, Ph.D., my father Lennart Zeberg, M.D., and Prof. Jonas Broman, Ph.D. In addition, I would also like to express my gratitude to Prof. Björn Meister, M.D., Ph.D., and Prof. Kaj Fried, Ph.D.

Moreover, I am deeply grateful to the staff at Thieme Medical Publishers that I have been in close contact with, in particular, the editorial director Anne Sydor, Ph.D., managing editor Judith Tomat, editorial assistant Tony Paese, and marketing agent David Towle.

I would also like to acknowledge the Federative International Programme for Anatomical Terminology (FIPAT) for their work towards a standard nomenclature in the field of anatomy.

Hugo Zeberg

Foreword

This *Atlas of Anatomy*, in my opinion, is the finest single-volume atlas of human anatomy that has ever been created. Two factors make it so: the images and the way they have been organized.

The artists, Markus Voll and Karl Wesker, have created a new standard of excellence in anatomical art. Their graceful use of transparency and their sensitive representation of light and shadow give the reader an accurate three-dimensional understanding of every structure.

The authors have organized the images so that they give just the flow of information a student needs to build up a clear mental image of the human body. Each two-page spread is a self-contained lesson that unobtrusively shows the hand of an experienced and thoughtful teacher. I wish I could have held this book in my hands when I was a student; I envy any student who does so now.

Robert D. Acland
Louisville, Kentucky

Preface

It is with a mix of pride and humility that we offer our 3rd edition of the *Atlas of Anatomy*. As with the previous editions, we have tried to respond to the requests, comments, and criticisms of our readers. Although this edition was prepared without the contributions of our friend and co-author, Lawrence Ross, who passed away in 2015, we have tried to maintain the same quality of excellence and attention to detail that he helped bring to the previous editions.

In this latest edition we focused our attention on three major tasks. The first reflects an understanding that anatomy is a changing science. Our readers understand that it is a dynamic part of clinical medicine, itself a science undergoing constant evolution. Concepts and terminology change accordingly and we feel a responsibility to pass on to our readers the most accurate and current information available.

Our second task was to add additional examples of sectional and radiographic images to help students apply their knowledge of anatomic structure and relationships to comparable clinical representations. While radiology as a clinical discipline is a specialty that requires expertise in diagnoses and treatment (and as such is not addressed here), the topographic interpretation of radiographic images is a natural companion to the study of anatomy. To this end, we have moved some images that were previously integrated into earlier chapters and added many new images to create a new *Sectional and Radiographic Anatomy* chapter in each unit.

Finally, we have expanded areas that deserved greater attention. A newly titled *Brain and Nervous System* unit replaces the former Neuro-anatomy unit. Here, the reader will find a greater focus on the gross anatomy of the brain and peripheral nervous system. We've also added new spreads on the autonomic nervous system, a topic that needed to be expanded. In the *Pelvis and Perineum* unit, some images were removed and others revised to

illustrate current anatomic theory. In addition, new art that better demonstrates the complex pelvic anatomy has been added throughout the unit.

As always, we thank reviewers, colleagues, and students who commented on previous editions and have suggested appropriate corrections.

We recognize that our efforts, though important, are just one part of the process that brings this textbook to your desk. Support from the entire Thieme Publishers team has been essential in creating the third edition. We are especially grateful to Julie O'Meara, Developmental Editor; Tony Paese, Editorial Assistant; Anne M. Sydor, PhD, Editorial Director, Educational Products; Barbara Chernow, PhD, Production Manager; and Carol Pierson, compositor, for excellence in their individual areas of expertise and their unwavering confidence in our ability to produce a quality manuscript.

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Preface to the First Edition

Each of the authors was amazed and impressed with the extraordinary detail, accuracy, and beauty of the illustrations that were created for the *Thieme Atlas of Anatomy*. We feel these images are one of the most significant additions to anatomical education in the past 50 years. It was our intent to use these exceptional illustrations as the cornerstone of our effort in creating a concise single volume *Atlas of Anatomy* for the curious and eager health science student.

Our challenge was first to select from this extensive collection those images that are most instructive and illustrative of current dissection approaches. Along the way, however, we realized that creating a single-volume atlas was much more than choosing images: each image has to convey a significant amount of detail while the appeal and labeling need to be clean and soothing to the eye. Therefore, hundreds of illustrations were drawn new or modified to fit the approach of this new atlas. In addition, key schematic diagrams and simplified summary-form tables were added wherever needed. Dozens of applicable radiographic images and important clinical correlates have been added where appropriate. Additionally, surface anatomy illustrations are accompanied by questions designed to direct the student's attention to anatomic detail that is most relevant in conducting the physical exam. Elements from each of these features are arranged in a regional format to facilitate common dissection approaches. Within each region, the various components are examined systemically, followed by topographical images to tie the systems together within the region. In all of this, a clinical perspective on the anatomical structures is taken. The unique two facing pages “spread” format focuses the user to the area/topic being explored.

We hope these efforts—the results of close to 100 combined years experience teaching the discipline of anatomy to bright, enthusiastic students—has resulted in a comprehensive, easy-to-use resource and reference.

We would like to thank our colleagues at Thieme Publishers who so professionally facilitated this effort. We cannot thank enough Cathrin E. Schulz, MD, Editorial Director, Educational Products, who so graciously reminded us of deadlines, while always being available to “trouble shoot” problems. More importantly, she encouraged, helped, and complimented our efforts.

We also wish to extend very special thanks and appreciation to Bridget Queenan, Developmental Editor, who edited and developed the manuscript with an outstanding talent for visualization and intuitive flow of information. We are very grateful to her for catching many details along the way while always patiently responding to requests for artwork and labeling changes.

Cordial thanks to Elsie Starbecker, Senior Production Editor, who with great care and speed produced this atlas with its over 2,200 illustrations. Finally, thanks to Rebecca McTavish, Developmental Editor, for joining the team in the correction phase. So very much of their hard work has made the *Atlas of Anatomy* a reality.

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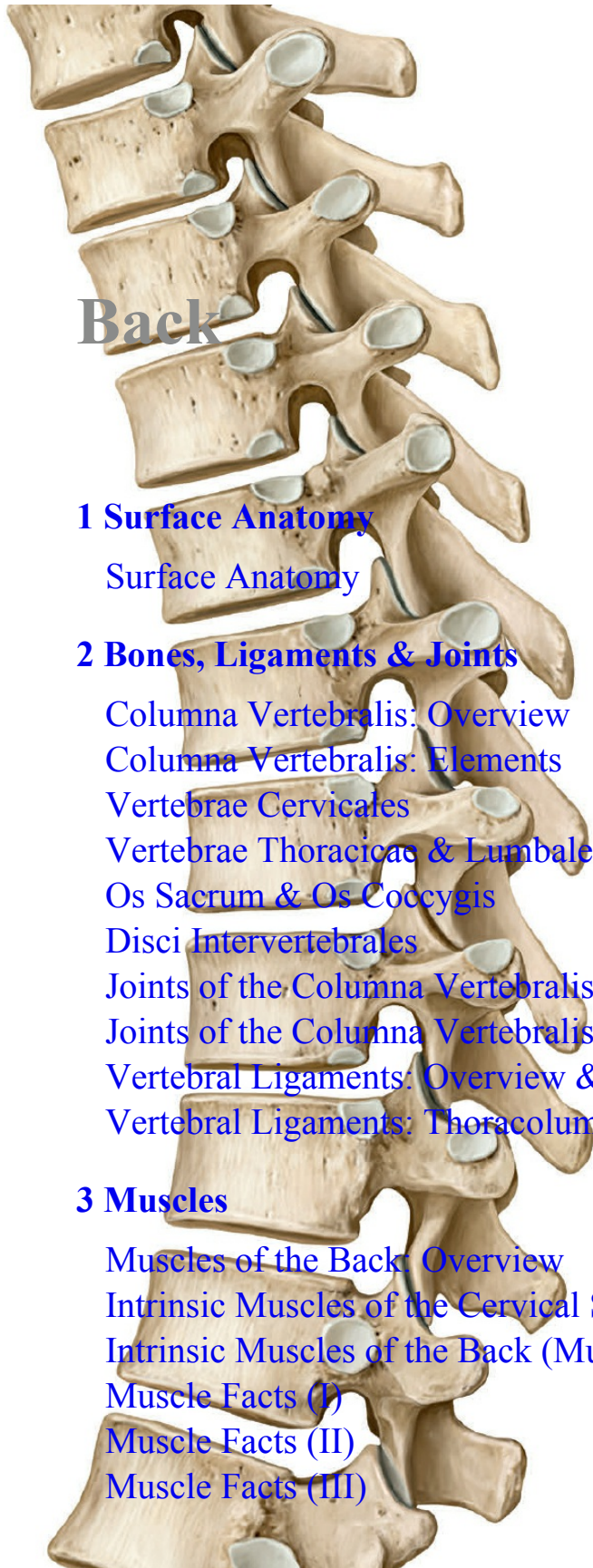
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Houston, Texas

A Note on the Use of Latin Terminology

To introduce the Latin nomenclature into an English textbook is a delicate task, particularly because the many Latin loanwords have passed into general use. Some loanwords are so common that fluency of the text would be disturbed if they were to be translated back into Latin. The Latin loanwords have typically undergone several adaptations before becoming part of the English language. A term such as *sympathetic trunk* (lat. *truncus sympaticus*) has undergone morphological adaptation (through the loss of masculine suffix *-us*), orthographical adaptation (through the substitution of a ‘Germanic’ *k* for a Latin *c*), and phonological adaptation (*th* and *e* instead of *t* and *i*). In addition, the word order has been reversed. The Latin term *sympaticus* is in fact borrowed from late Greek *sympathetikos* (from *sympathes* ‘having a fellow feeling, affected by like feelings’), thereby illustrating that terms move between languages when cultures meet. Other anatomical terms are so colloquial (e.g., *hand*), that a Latin term (e.g., *manus*) would be inappropriate to use at all occasions. Clearly, the text would easily become unreadable if a strict translation of all English terms into Latin were imposed. As a result, Latin has been used as long as it does not disrupt the flow of the text and whenever possible in figures and tables. In some cases, dual terminology has been used, with either the English or Latin word in parentheses. As much as possible, the terminology of *Terminologia Anatomica* (1998) has been followed.

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Back

1 Surface Anatomy

Surface Anatomy

2 Bones, Ligaments & Joints

Columna Vertebralis: Overview

Columna Vertebralis: Elements

Vertebrae Cervicales

Vertebrae Thoracicae & Lumbales

Os Sacrum & Os Coccygis

Disci Intervertebrales

Joints of the Columna Vertebralis: Overview

Joints of the Columna Vertebralis: Craniovertebral Region

Vertebral Ligaments: Overview & Cervical Spine

Vertebral Ligaments: Thoracolumbar Spine

3 Muscles

Muscles of the Back: Overview

Intrinsic Muscles of the Cervical Spine

Intrinsic Muscles of the Back (Musculi Dorsi Proprii)

Muscle Facts (I)

Muscle Facts (II)

Muscle Facts (III)

4 Neurovasculature

Arteries & Veins of the Back

Nerves of the Back

Medulla Spinalis (Spinal Cord)

Segments of the Medulla Spinalis & Nervi Spinales

Arteries & Veins of the Medulla Spinalis

Neurovascular Topography of the Back

5 Sectional & Radiographic Anatomy

Radiographic Anatomy of the Back (I)

Radiographic Anatomy of the Back (II)

1 Surface Anatomy

Surface Anatomy

Fig. 1.1 Palpable structures of the back
Posterior view.

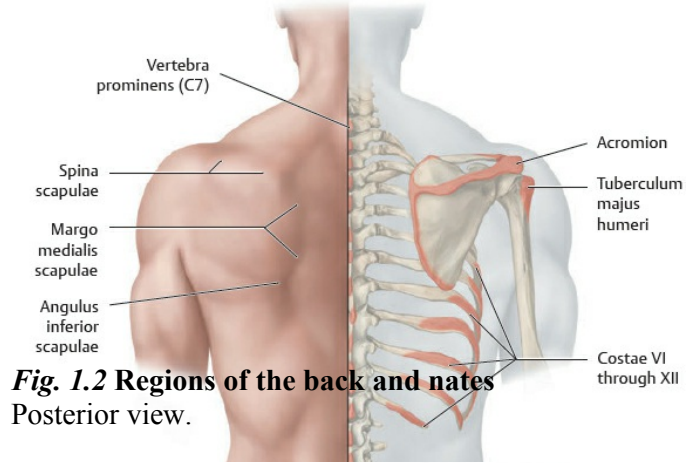


Fig. 1.2 Regions of the back and nates
Posterior view.

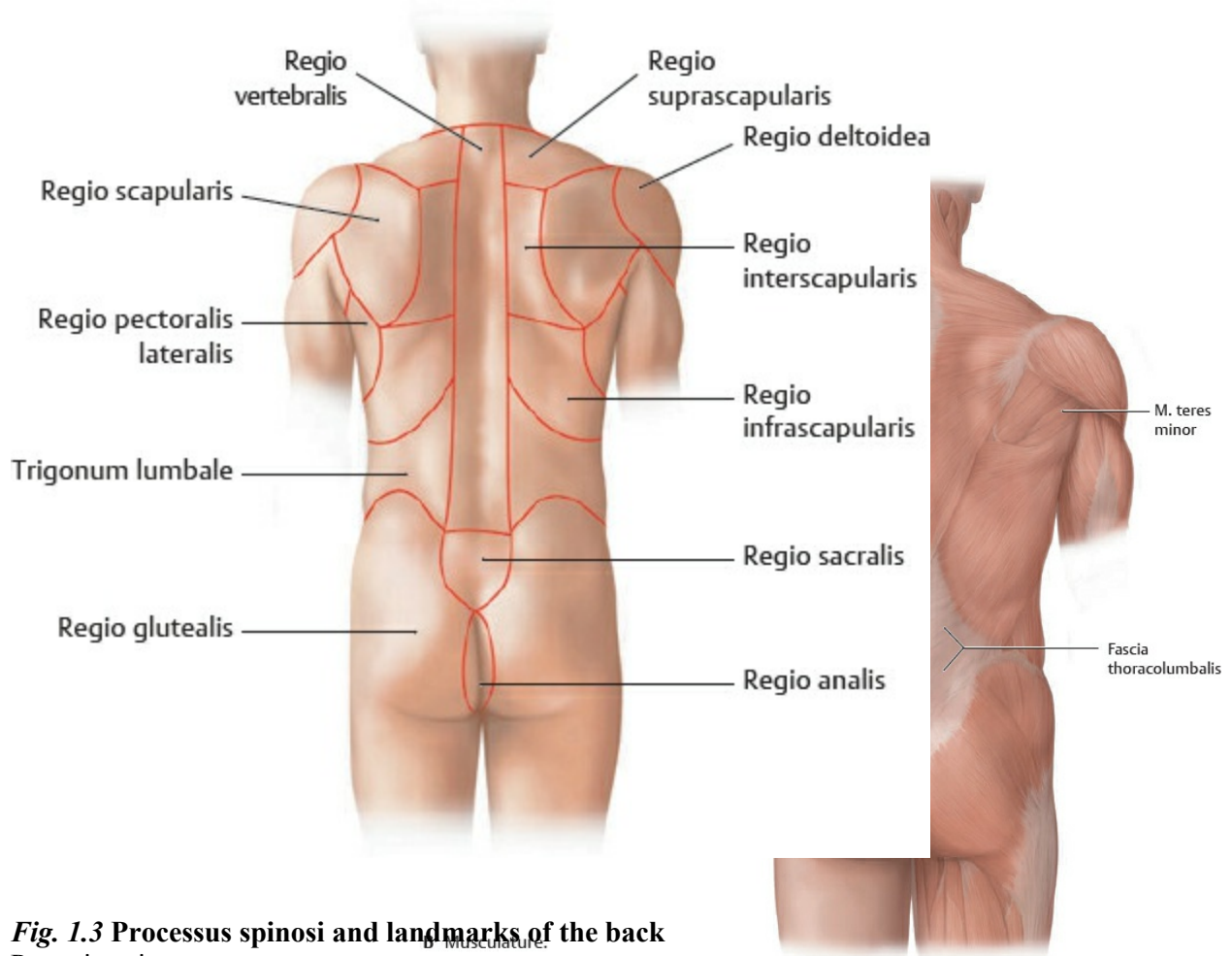
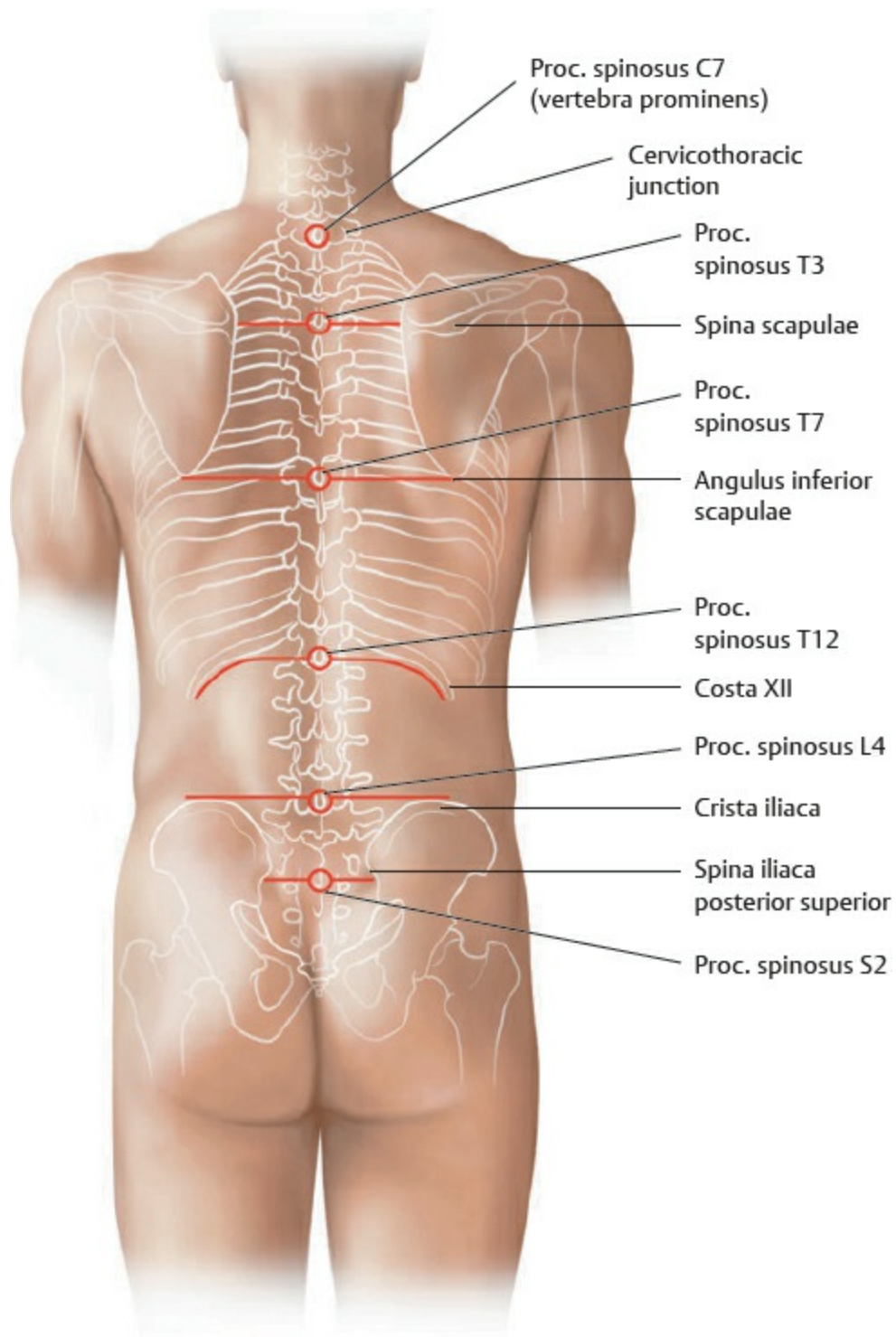


Fig. 1.3 Processus spinosi and landmarks of the back
Posterior view.



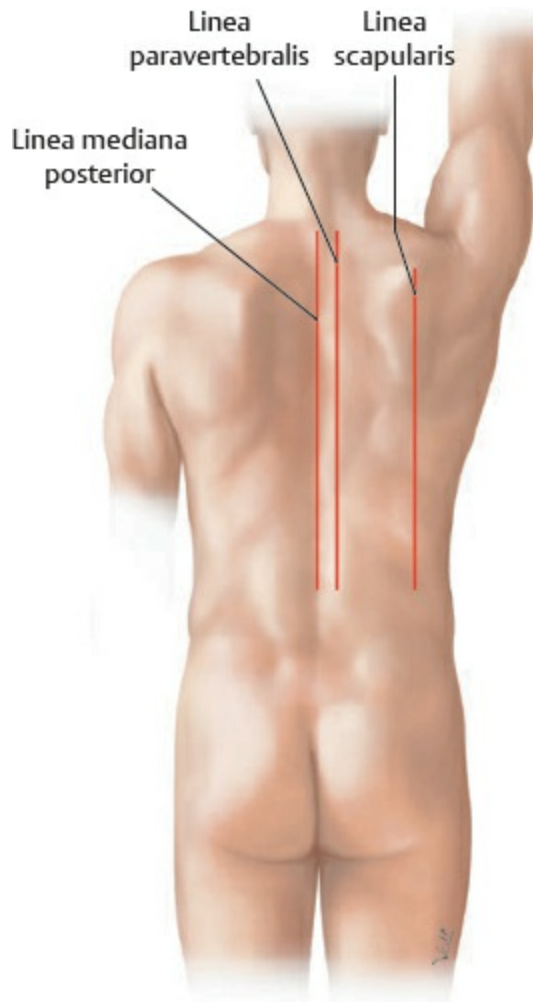


Table 1.1 Reference lines of the back

Linea mediana posterior	Posterior trunk midline at the level of the procc. spinosi
Linea paravertebralis	Line at the level of the procc. transversi
Linea scapularis	Line through the angulus inferior scapulae

Table 1.2 Processus spinosi that provide useful posterior landmarks

Vertebral processus spinosus	Posterior landmark
C7	Vertebra prominens (the projecting proc. spinosus of C7 is clearly visible and palpable)

T3	The spina scapularis
T7	The angulus inferior scapulae
T12	Just below costa XII
L4	The summit of the crista iliaca
S2	The spina iliaca posterior superior (recognized by small skin depressions directly over the spinae iliacae)

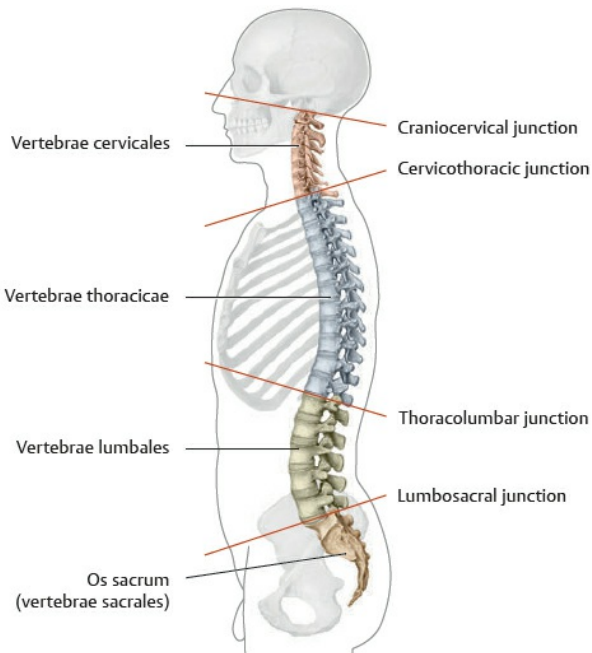
2 Bones, Ligaments & Joints

Columna Vertebralis: Overview



The columna vertebralis (spine) is divided into four regions: the vertebrae cervicales, thoracicae, lumbales, and sacrales. Both the cervical and lumbar spines demonstrate lordosis (inward curvature); the thoracic and sacral spines demonstrate kyphosis (outward curvature).

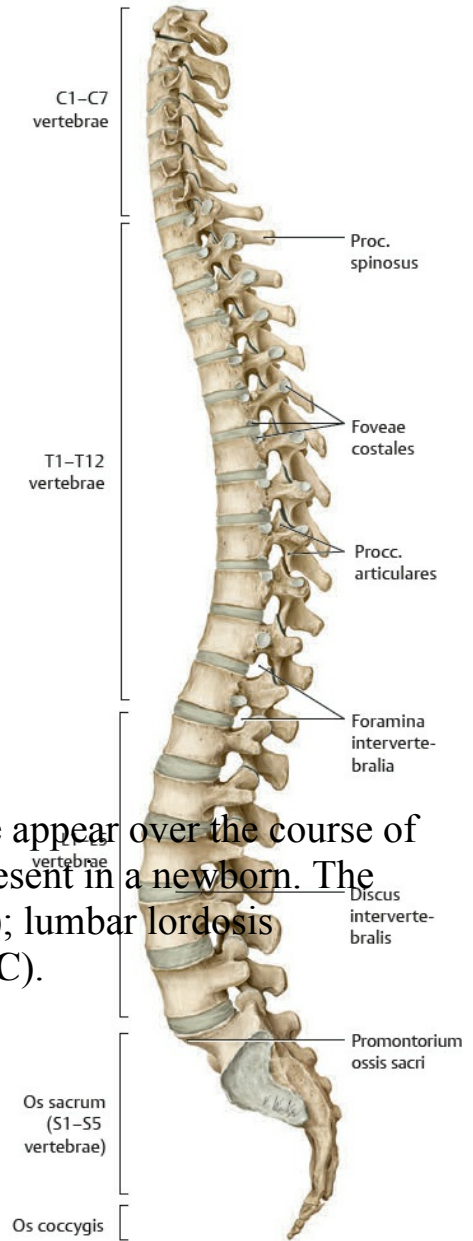
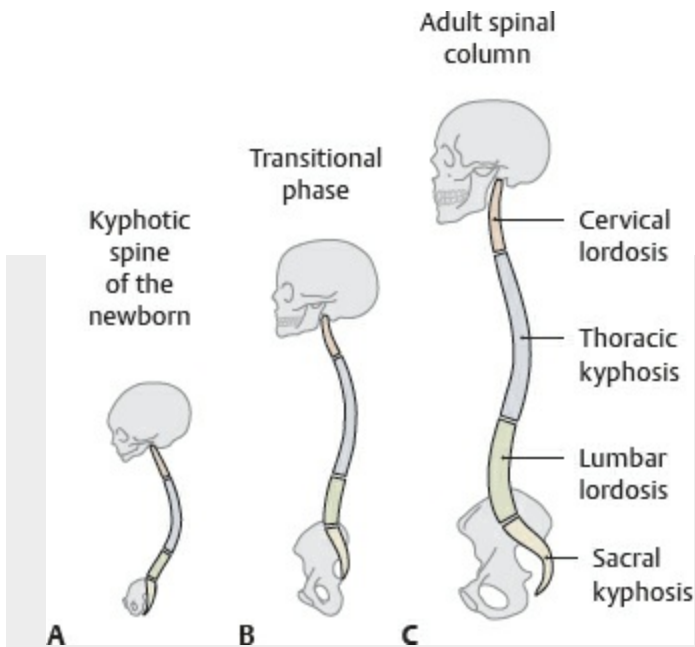
Fig. 2.1 Columna vertebralis
Left lateral view.



Clinical box 2.1

Spinal development

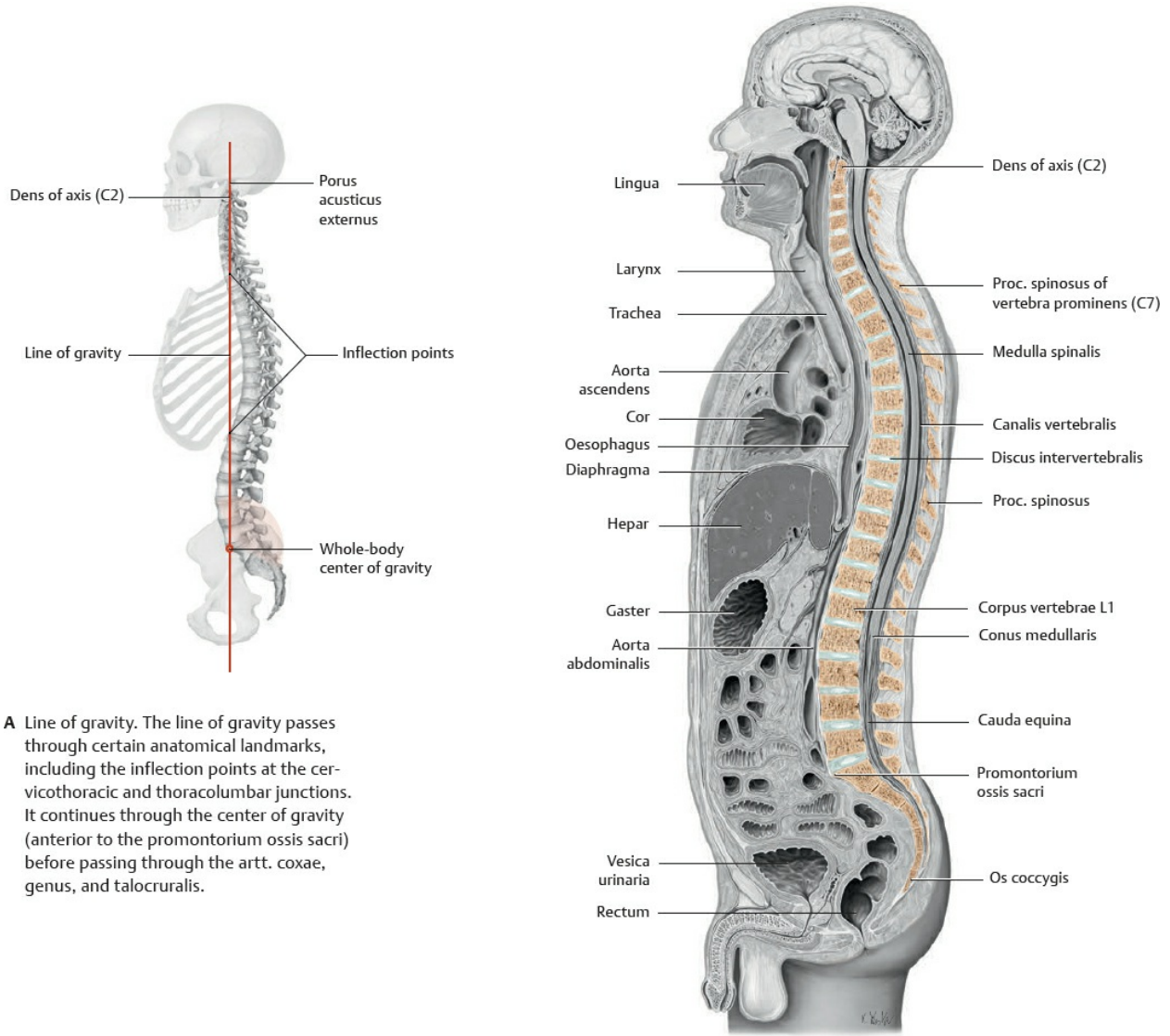
The characteristic curvatures of the adult spine appear over the course of postnatal development, being only partially present in a newborn. The newborn has a “kyphotic” spinal curvature (A); lumbar lordosis develops later and becomes stable at puberty (C).



B Bony columna vertebralis.

Fig. 2.2 Normal anatomical position of the columna vertebralis

Left lateral view.



A Line of gravity. The line of gravity passes through certain anatomical landmarks, including the inflection points at the cervicothoracic and thoracolumbar junctions. It continues through the center of gravity (anterior to the promontorium ossis sacri) before passing through the artt. coxae, genus, and talocruralis.

B Midsagittal section through an adult male.

Columna Vertebralis: Elements

Fig. 2.3 Bones of the columna vertebralis

The procc. transversi of the vertebrae lumbales are originally rib rudiments and so are named procc. costales.